Conclusion: In post-MI patients receiving an up-to-date treatment Turbulence Onset and Turbulence Slope are superior to other established parameters of heart rate variability.

1213-7 Anatomical Basis of P Wave Duration Dispersion for the Prediction of the Development of Atrial Fibrillation After Cardiac Surgery

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Background: Atrial fibrillation (AF) is a common arrhythmia in clinical practice, and occurs frequently after cardiac surgery. Previous studies have described greater dispersion of P wave duration (P-disp) in patients (pts) with a history of AF. However, the possible predictive value of P-disp for the prediction of the development of AF remained to be clarified. Furthermore, the pathogenesis of P-disp is also unclear. The aim of this study is to evaluate prospectively whether P-disp could predict the AF development after cardiac surgery and to elucidate the pathophysiology of P-disp from the viewpoint of atrial fibrosis.
Methods: We studied 30 consecutive pts undergoing cardiac surgery. Before the surgery, P wave signal-averaged ECG was recorded from standard 12 leads and 10 extra-precordial leads (two intercostal spaces upper and lower V1, V2 and V4-6). P-disp was defined as the difference between the maximum and minimum of filtered P wave duration in all of the leads. Abnormal P-disp was defined as more than 20 ms, mean+2SD of P-disp (13.3±3.1 ms) in 12 age and sex-matched controls. The right atrial auricle resected for pump on was sampled at each surgery. The extent of atrial fibrosis (%F) of all samples was estimated by the point count method.
Results: During the follow-up period of 31±19 days, 13 of 30 pts developed AF. Eleven (43%) of 16 pts with abnormal P-disp had the development of AF, while AF development was observed in 2 (14%) of 14 pts without abnormal P-disp. Kaplan-Meier analysis revealed that AF development was significantly more often observed in pts with than without abnormal P-disp (p=0.0035). Relative risk for the development of AF in abnormal P-disp was 4.82 (95%CI 1.28 to 18.1). Pts with AF development had significantly greater P-disp (26.1±6.1 vs 17.8±4.0 ms, p=0.0001) and larger %F (23.8±8.0 vs 11.5±5.5 %, p<0.0001) than those without AF development. There was a significant correlation between P-disp and %F (r=0.842, p<0.0001).
Conclusion: P-disp is a potent predictor of AF development after cardiac surgery. Atrial fibrosis might play a role in the genesis of greater P-disp in patients with AF.

1213-8 Rest Redistribution Imaging: A Novel Standard for Assessing ECG Criteria for Myocardial Infarction

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Background: Few studies have tested the assumption that an abnormal Q wave reflects prior myocardial infarction (MI). Our previous work using resting myocardial scintigraphy (MS) to identify MI found Q and QS criteria of the Minnesota Code (MC) had a sensitivity of 0.58 and a positive predictive value of 0.53. Concerned that a resting defect might reflect intense ischemia rather than MI and thus be responsible for false negative ECG findings, we tested the accuracy of ECG criteria to detect MI against a redistribution MS obtained as part of a viability study 4 hours after a resting injection.
Methods: Redistribution images from 31 consecutive pts were scored by an experienced nuclear cardiologist using the Sum Stress Score. The presence of any defect on the reperfusion MS was taken as evidence of prior MI. Two experienced readers each evaluated contemporaneous ECGs using the MC and Sylvester Score (SS), and then compared the sensitivity of both systems to detect MI.
Results: Of 20 pts with defects, 16 (80%) were identified by the SS and 13 (65%) by the MC. Of the 11 pts with the largest thallium defects, 10 were identified by MC criteria. Of 11 pts with no defect, 10 (91%) were erroneously identified by SS as having had MI as were 7 (64%) by the MC. In 4 of the 7 pts with false positive MC criteria, the strictest criteria (1.1) were met.
Conclusions: The sensitivity of MC criteria was minimally improved when compared to our previous work (0.65 vs 0.58). Any improvement could reflect a reduction in defects due to intense ischemia rather than MI. The frequency of false positive results was remarkably high with both standards. Rest/redistribution MS deserves further study as a "gold standard' for assessing ECG criteria for prior MI.

1213-9 Circardian Variation of QT Dispersion Determined by Twelve-Lead Holter Electrocardiography in Patients Without Coronary Artery Disease

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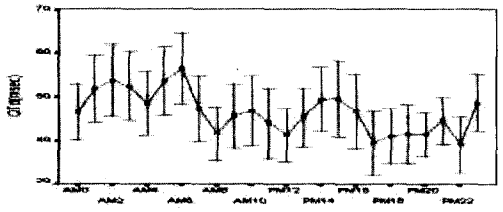
Background: Increase of QT dispersion (QTd) was associated with cardiac events. The onset of some cardiac events was reported to have higher frequency in early morning. Whether QTd has circadian variation is still not well established. Using 12-lead Holter electrocardiography (ECG), we will determine circardian variation of QTd in patients without coronary artery disease.
Methods: Thirty patients (16 male, 14 female, mean age 54±12 years) were enrolled to this study. Normal coronary angiography was confirmed by cardiac catheterization. The 12-lead Holter ECG was performed in each patient for 24 hours. The QT interval at each hour was measured manually from the 12-lead Holter ECG recording by digital screen caliber, and the QTd for each patient was calculated. The mean QTd for all patients at each hour during a day were analyzed and compared.
Results: The total of 720 value of QTd were analyzed. The average mean QTd for all 30 patients in 24 hours was 46.49 ± 19.40 msec. The QTd of period between A.M. 2:00 to A.M. 6:00 is significant longer than that of other period of a day (mean was 52.86 ± 14.53 msec and 44.81 ± 10.14 msec, respectively, P< 0.01).
Conclusion: The QTd of patients without coronary artery diesase has circardian variation. During a day, the QTd of eary morning period (A.M. 2:00 to 6:00) are longer than that of the rest of a day.



1213-10 Correlation Between QRS Duration and Ejection Fraction Among 679 Patients With Ejection Fraction =0.40 and Congestive Heart Failure

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Background: Electrical conduction abnormalities are common among patients with congestive heart failure (CHF). We sought to determine whether QRS duration correlates with ejection fraction (EF) in patients with left ventricular systolic dysfunction.
Methods: We reviewed the demographics, etiology of systolic dysfunction, and electrocardiograms of patients with EF ≤0.40 and symptomatic CHF who were enrolled in our CHF care management program. The relationship between QRS duration and EF was examined. Risk factors for substantial QRS prolongation (≥130ms) were identified by multiple logistic regression .
Results: A total of 679 patients (65% male) were included in this analysis. Mean age was 67.7±12.6 years, mean EF was 0.30±0.07, and mean QRS duration was 112±28 ms. QRS duration ≥130ms was present in 161 (23.7%) patients. Etiology of CHF was ischemic in 456 (67%) and nonischemic in 223 (33%). Age, EF, and an ischemic cause of CHF were found to correlate with QRS duration (correlation coefficient R= -0.15, -0.20 and -0.17, respectively, p<0.001 for all). The table shows the risk factors for a substantially prolonged QRS (≥130ms) by multiple logistic regression.
Table. Risk factors for QRS duration≥130ms.

	Odds ratio	95% confidence interval	P value
Age	1.03	1.02-1.05	<0.001
EF	1.03	1.01-1.06	0.009
Ischemic cause of CHF	1.08	0.72-1.26	0.694

Conclusion: Among patients with EF ≤0.40, age and EF independently correlated with QRS duration. The adjusted odds ratio for developing a prolonged QRS (≥130ms) was 1.03 for every year increase in age and 1.03 for every percent decrease in EF.

1213-11 QRS Duration Is Associated With Abnormalities in Cardiac Structure and Function

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Background: In small cohort studies, pathologic prolongation of the QRS interval, as evidenced by LBBB, has been associated with abnormalities in cardiac structure and function, however, little data is available regarding QRS duration and its relationship to LV mass and systolic function.
Methods: We collected data from ECGs and echocardiograms in 8,758 patients to determine the relationship between QRS duration and indices of left ventricular mass and systolic performance. Left ventricular hypertrophy was defined as a LVMI>104 g/m2 in women and >116 g/m2 in men. Systolic dysfunction was defined as an ejection fraction (EF) < 50% as determined by echocardiography.
Results: (See table; *p<0.0001 compared with QRS <100, †p<0.0001 compared with QRS 100 - 200) QRS duration correlated directly with LV mass (r = 0.40; p<0.0001) and inversely with EF (r = -0.36, p<0.0001).
Conclusion: QRS duration by routine ECG correlates significantly with LV mass and measurements of systolic function. Although QRS duration >120 msec are generally considered to be associated with cardiac abnormalities, borderline QRS duration (100-120 msec) were associated with a 2-3 fold increased prevalence of LVH and systolic dysfunction compared to patients with QRS duration <100 msec.

QRS duration (msec)	< 100	100-120	> 120
N	6592	1339	827
EF	58.5±9.3	53.2±14.3*	45.8±17.9*†
LV mass (g)	154±55	200±71*	217±94*†
LVMI (g/m2)	72.7± 29.5	87.5±39.0*	89.1±47.8*
Presence of LVH	8.9%	19.8%*	26.4%*†
Systolic Dysfunction	7.6%	21.0%*	39.8%*†